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ABSTRACT

This report describes a study of the effects of environmental complexity on managers of semipublic organizations, in particular, school principals. Although some previous empirical studies do estimate relationships between principals' management activities and individual elements of schools' immediate organizational contexts, researchers have yet to determine how principals adjust their activities in complex school contexts comprising many different and even conflicting elements. The results of the study show that in nation-specific analyses: (1) variation in principals' instructional management activity associates with variation in local and national stakeholders' influence on curriculum, variation in curricular and administrative centralization, and variation in school environmental complexity; and (2) centralization contextualizes the effect of local environmental complexity on principals' management activity. In cross-national analyses, however, there are few clear associations between principals' management activity and stakeholders' influence, centralization, or environmental complexity. (Contains 7 tables delineating analyses of the data and 34 references.) (Author)

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THE EXPECTATION PARADOX IN FORTY NATIONS: A CROSS-NATIONAL ANALYSIS OF HOW SCHOOL ENVIRONMENTS INFLUENCE WHAT SCHOOL PRINCIPALS DO

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ABSTRACT

This study shows the effects of environmental complexity on managers of semi-public organizations; in particular, school principals. Although some previous empirical studies do estimate relationships between principals' management activities and individual elements of schools' immediate organizational contexts, researchers have yet to determine how principals adjust their activities in complex school contexts comprising many different and even conflicting elements. The results of the study show that in nation-specific analyses (1) variation in principals' instructional management activity associates with variation in local and national stakeholder influence on curriculum, variation in curricular and administrative centralization, and variation in school environmental complexity, and that (2) centralization contextualizes the effect of local environmental complexity on principals' management activity. In cross-national analyses, however, there are few clear associations between principals' management activity and stakeholder influence, centralization, or environmental complexity.

THE EXPECTATION PARADOX IN FORTY NATIONS: A CROSS-NATIONAL ANALYSIS OF HOW SCHOOL ENVIRONMENTS INFLUENCE WHAT SCHOOL PRINCIPALS DO

The fundamental question this study asks is why managers in semi-public organizations do what they do. This is one of the most central questions in managerial and administrative debates, but few sociological studies have considered the influence that the environmental complexity of schools as semi-public organizations has on principals' managerial activities.[1] Previous studies of this phenomenon have been limited because school contexts are often without clear borders and, consequently, cross traditional contextual boundaries demarcated by regions ranging from local communities to regional districts to nation-states. As a result, the boundaries of schools' contexts are often undefined, or only vaguely defined. This means that it is difficult to talk about where contextual influences on school principals begin and end, thereby making existing reform-minded research on principals' management activity largely inaccurate. This difficulty leads to a more sociological than educational research question: Why do school principals do what they do given the variation in school environments both within and between organizational levels of schooling?

In answering this question the problem of broad and ambiguous definitions of schools' contexts is significant because "environment" is a key concept of sociological

[1] Complexity in this sense can be anything that complicates decision-making and other rational processes. For example, complexity in school contexts may vary given different

and organizational theory related to managerial activity. And, although some previous empirical studies do estimate relationships between principals' management activities and individual elements of schools' immediate contexts (Leithwood & Duke, 1999), researchers have yet to determine how principals adjust their activities in complex school contexts comprising many different and even conflicting elements. In other words, the problem is that no one has yet estimated principals' management activities based on the complexity of school contexts, especially at the national and cross-national levels.

This study seeks to address this problem by cross-nationally examining the managerial activities of school principals and analyzing the influence of complex school environments on principals' activities at both the local and national level. In particular, this study determines how the complexity of school contexts influences principals' management of instruction by estimating (1) the effect of the complexity of the school's governance context on principals' instructional management activity as well as (2) the ways in which the broader organizational environment influences the intensity of this relationship.

BACKGROUND OF THE PROBLEM

The problem addressed in this study concerns the influence of organizational complexity and governance environments on managerial behavior. The case I address this problem with is the school principal as school manager. There are several relevant research literatures on school principals that deal with other relevant questions this study

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numbers of students enrolled, numbers of full-time teachers and staff, and numbers of

raises. For instance, why is what principals do an important topic of study, and how have the contexts of schools come to play such a significant role in determining what school principals do. I answer each of these questions below.

As the so-called "leaders" of their schools, principals and their management styles or activities are studied, scrutinized, and critiqued by everyone from the students in their schools to the legislators in their states and nations. This presumption of "leadership" in what is nonetheless a largely managerial role is why there is interest in what school principals do. Principals are frequently idealized as motivating and responsible leaders that drive or "cause" schooling. Given this position of leadership, critiques and studies of how and why principals manage schools the way they do have reported and prescribed almost every conceivable action that principals are capable of making from roaming the hallways of their schools, to conducting community forums, to delegating most of their management responsibilities to subordinates (Alfonso, Firth, & Neville 1981; Blase & Blase 1998; Blumberg & Greenfield 1980). Therefore, the specific behaviors and activities that principals do or should engage in is overwhelmingly described in the literature, even if not always explained or empirically analyzed.

Principals, however, are not the first managers to receive this much attention. In fact, the dividing line between leadership and management is often blurred in other fields of study as well. And although leadership and management are technically different, most of the literature does not make a clear distinction between the two. As a result, determining the best practices of organizational managers is a time-tested theme of

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influential stakeholders.

administrative research. These best practices frequently refer to the influence managers have on the performance of their organizations. School principals are subject to this scrutiny as well. Consequently, principals' impact on instruction has been repeatedly discussed among researchers, policymakers, and practitioners. Interestingly, this emphasis on principals as "instructional leaders" is what has turned some of the attention to the contextual elements influencing what principals do.

PRINCIPALS AS MANAGERS OF BUREAUCRATIC ORGANIZATIONS

The bureaucratic administration of formal organizations is an important sociological phenomenon and is by no means unique to discussions of schools or school principals (DiMaggio & Powell 1991; March 1965; Meyer, Scott, Strang, & Creighton 1988; Silverman 1971; Weber 1946). Therefore, how white-collar bureaucratic organizations are managed is and has historically been of particular sociological as well as administrative interest. As a result, prescriptions for administrative as well as managerial activity are widely debated and discussed in both the organizations and management literatures (Hales 1986; Noordegraaf & Stewart 2000; Sayles 1964; Stewart 1989;). Within these debates, there are rich discussions of various relationships between managerial activity and organizational output (Corwin 1981; Firestone 1985; Gamoran & Dreeben 1986; Ingersoll 1993; Orton & Weick 1990; Ouchi 1977; Perrow 1986). And, while these discussions are not unique to the sociological literature, special attention has been given to the association of managerial activities with organizational outputs of schools.

Principals' management activities in schools are unique compared to managers in other organizations because of the character of schools as public service as well as publicly-funded organizations where high degrees of organizational autonomy and external penetration are both expected and required (Ingersoll 1993; Meyer & Scott 1983; Weick 1976). Even though these levels of organizational autonomy vary by national system, schools are ideal for the examination of the relationship between managerial activity and organizational environments. In fact, it is the variation in national systems of education that may be a significant predictor of the instructional management activities of principals situated within these various systems. This variation in schools' "environments" at not only the local, but also national levels means that principals' management of schools becomes a bureaucratic administrative function within at least two organizational contexts.

Principals must manage their schools according to local school community contexts and immediate needs, while also considering and responding to national educational goals, trends, and expectations for schooling. Therefore, what principals do may be a response to school level needs, nation level expectations, or both. Each of these levels of needs and expectations may be called an *organizational environment* in the sociology of organizations literature (Meyer & Associates 1978; Meyer & Scott 1983). At each level, these organizational environments are characterized by varying levels of

complexity. *Complexity* in organizational environments is largely a product of the number of stakeholders, needs, or expectations focused on the organization in question; namely, schools.

Therefore, a complex school level organizational environment would be one in which principals have many different interest groups or educational stakeholders involved in curricular decision-making. For example, the more that businesses, religious groups, parent associations, and other school community groups have a part in deciding what curriculum is taught to students in a particular school, the more complex the organizational environment of that school is. These sorts of complex environments for schools are more common in decentralized national educational systems such as in the United States where school penetration from non-school-related entities is frequent. On the other hand, a simple environment for schools would be one in which curricular decision-making was a function restricted to the centralized bureaucratic authority of a national Ministry of Education or similar entity, such as it is in France where it is often joked that educational bureaucrats know what each classroom across France is doing every hour of every day.

Complexity in schools' environments is not a function restricted to either the local or national organizational levels. This complexity can also be a product of the combined stakeholders, needs, and expectations for schools occurring at both the local school and national organizational levels. Therefore, schools in systems that have centralized goal- or standards-setting authority and decentralized implementation authority will be some of the most complex environments for schools because standards and expectations from the

national level may both coincide and conflict with local level implementation needs and expectations. In other words, complexity can occur both *within* single levels of schools' organizational environments (such as local and national) or as an interaction *between* these levels of organizational environment (Fletcher & Sabers 1995). In other words, there are not clear boundaries between these organizational environments because they are, in fact, nested; meaning that schools' local communities and contexts are nested within national systems of education and national contexts for educational accountability and expectations. This nesting and mixing of environmental influences occurs in spite of traditional boundaries such as are politically defined by distinct districts and states. It is this combination of complexity both within and between levels of schools' organizational environments that may be one of the most significant elements determining principals' instructional management activity.

Organizational and managerial perspectives suggest that managerial activity, which has over the years been defined as literally every activity engaged in as a part of an individual's role as manager of each particular organization, is largely a response to the characteristics of the organization itself and the organizational environment rather than initiatives inspired by individual managers' motives or the individual performances of those individuals that comprise the technical core of the organization. Nonetheless, within the instructional leadership and policy fields there is a substantial body of literature that suggests there is a positive, causal relationship between the activity of principals and the outcomes of schooling.

Principals' instructional management activity is also an example of the relationship between educational policy and its intended effect. The relationship of local or school level policy as realized through the activity of principals and both the intended or unintended effects on instruction and achievement provide a microcosm of the relationship, if any, between organizational norms and organizational output. With increasing consistency, student achievement reports and comparisons at both the national and international levels drive nation-state level educational policies and declarations (Meyer & Baker 1996). These policy statements and declarations, however, often target the structure, methods, and rigor of sub-national (i.e., state and local) educational systems rather than the material resources and opportunities to learn that were the foci of many research studies and reports in the latter half of the 20th century.

A growing sociological perspective sometimes called *neo-institutional* (DiMaggio & Powell 1991) suggests that the association of managerial activity with organizational output, such as student performance, has been and continues to be particularly weak in schools in spite of increasing pressure to standardize and regulate this relationship. Some often cited reasons for weak associations are *loose coupling* or *decoupling* processes, which suggest that school managers dedicate more time and resources to legitimizing the processes and consequences of schooling relative to their schools' organizational environments than improving the technical output of instruction (Meyer & Rowan 1977; Weick 1976). Consequently, curricular centralization and centralization of decision-making at the national level may determine principals' ability or opportunity to contextualize instruction within their schools (Stevenson & Baker, 1991).

The same institutional influences that contribute to the training, education, and activity of principals as rationalized and legitimate models of school administration are products of the environment and preexisting levels of school performance at least as much as they are causes of it. Therefore, principals' management of both material and personnel resources is not as influential as the environment or context, which preexists schooling processes and permeates most aspects of schooling students receive. As a result, principals' instructional management activity is caught between local school environmental pressures and national environmental pressures. So, principals respond to (1) pressures at the system level for legitimacy and (2) pressures from the local level for accommodation. How principals respond to these discrepant pressures, unfortunately, is not answered or empirically estimated in the literature, neo-institutional or otherwise.

While some of the activity of principals as school managers surely follows technical-rational, bureaucratic models, the more organizational and institutional elements of managerial activity are frequently described as agency-less "actions" performed in accordance with legitimate, scripted models of activity (Brignall & Modell, 2000). Yet to deny that these models exist and that principals behave in a manner appropriate to maintaining not only their individual legitimacy but also the legitimacy of

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[2] Excluded activities are hours per month principals reported spending hiring teachers; representing the school in the community; representing the school at official meetings; engaging in internal administrative tasks; talking with parents; counseling and disciplining students; responding to requests from district, state, or national education officials; and "other" activities.

their organizations (i.e., schools) in both local and national contexts would be to deny the influence of organizational environment. In fact, what drives much of principals' actions is their attention to and need for legitimacy at both the local and national levels. Yet what constitutes legitimate activity at the local level may not and often does not correspond to what constitutes legitimate activity at the national level. In fact, while certain organizational norms may exist at both levels, the process or method of achieving these norms may vary significantly.

In the highly charged institutional environments of schools, principals' instructional management activity is driven more by outside institutional pressures than internal concerns for technical output. This is not to say that technical output is not part of the environmental mix for schools or is not a concern of principals. Instead, a loosely coupled model suggests that many other objectives occupy principals' time and efforts, and these are often institutional requirements from the outside of the technical school system (Meyer & Scott 1983).

In addition, there has been no attempt to determine whether there is a cross-nationally institutionalized model for school principals' instructional management activity such as there has been to determine how school organizational structure and curricula are institutionalized in the modern and post-modern eras (Benavot, Cha, Kamens, Meyer, & Wong 1991) or that teachers follow institutionalized norms for behavior and activity that do not necessarily correspond to cultural or regional traditions (LeTendre et al. 2001). In other words, both Benavot et al. (1991) and LeTendre et al. (2001) find evidence that there are norms for school curriculum and classroom instruction

that transcend local or regional idiosyncrasies and are relatively standard in many otherwise dissimilar national systems of contemporary mass schooling. In fact, this argument that certain elements of mass public schooling have become institutionalized across most school organizations suggests that in the broadest sense schools are generally large-scale and organizationally complex due to high enrollment rates, long periods of formal schooling, and increased access and opportunity for a wider swath of potential students. These institutionalized elements of schooling also suggest that schools are generally public, professionally staffed, and "officially" undifferentiated within systems. Given these similarities in schools across national educational systems, is there also an institutionalized model for principals' instructional management activity that crosses national boundaries and transcends potentially unique elements of schools environments? The problem of defining environmental boundaries of school organizations and the effects of school organizations' environmental complexity on principals' instructional management activity suggests the increasing importance of the issue of "coupling" to this study. In particular, the juxtaposition of school principals within and between local and national environments of schools leads to the dilemma of dual or multiple couplings between principals' instructional management activity and various elements of complex school environments.

PROPOSITIONS AND HYPOTHESES

The first proposition and hypothesis suggest that the relationship between schools' organizational environments and principals' instructional management activity is

more strongly associated than principals' agency and technical school outcomes such as student achievement. In other words, school organizational environments are replete with norms for principals' instructional management activity and pressures from various stakeholders and constituents. These organizational norms and pressures inherent in schools' environments both influence how principals act and the kinds of principals managing at specific schools. For example, a principal who relies on the participation and encouragement of parents in improving students' academic achievement will probably not last very long in a working class community where most parents are busy with shift work and are suspicious or distrustful of schools themselves. On the other hand, this sort of parent-inclusive principal is quite appropriate for middle and upper class schools where parents not only have work schedules flexible enough for them to participate in their children's schooling, but they also want to participate having had relatively successful academic careers themselves and valuing academic achievement in their own children. Thus, the first proposition suggests that principals' instructional management activity is a response to school environmental norms and pressures.

Proposition 1: ***Principals manage instruction according to organizational norms established by environmental pressures.***

If this proposition is true, then variation in principals' instructional management activity should associate with variation in school environment indicators. And principals'

instructional management activity should also associate with variation in these indicators at each organizational level of schools' environments, both local and national.

Hypothesis 1a: *Variation in principals' instructional management activities associates with variation in local stakeholder influence on curriculum.*

Hypothesis 1b: *Variation in principals' instructional management activities associates with variation in the national stakeholder influence on curriculum.*

Hypothesis 1c: *Variation in principals' instructional management activities associates with variation in curricular and administrative centralization.*

These hypotheses suggest that what principals do is indeed related to the environments of schools and that this relationship is further complicated by association at two levels. They also very straightforwardly introduce the concept of loose coupling into these analyses and tie into the organizational approach to principals' instructional management activity by providing the opportunity for principals' instructional management activity to couple to either the local environment, the national environment, or both. These hypotheses also suggest that principals' instructional management activity respond to schools' environmental conditions rather than that principals adjust their managerial activity to affect certain outcomes. Instead, the expectation is that principals'

instructional management activity associates with both local and national environments. There is not yet any determination of which association is stronger or the effects of the local environment being nested within the national environment, although these considerations are coming. In fact, the final proposition and hypotheses attempt to place principals' instructional management activity in relation to the complexity and interaction of local and national organizational environments of schools.

Orton and Weick (1990:219) argue that "to assert that a system is loosely coupled is to predicate specific properties and a specific history to the system, rather than an absence of properties." This study of principals' instructional management activity and effects relies upon this assertion. In fact, the argument presented here suggests that principals' activities are loosely coupled with students' performance and perhaps even decoupled from individual student achievement. In other words, the often hypothesized and assumed causal relationship between principals' instructional management activity and student achievement is inconsistently reported and expected to be non-significant in both multilevel and cross-national analyses. Instead, a loosely coupled relationship between organizational environments and principals' activity may exist at the school level, but at this school level any causal relationship is either eliminated or reciprocal. This conception of loosely coupled relationships relies upon the concept of a fragmented external environment as explained by Orton and Weick (1990:207). In other words, the incompatible expectations discussed by Meyer and Rowan (1977), lead to "buffering, building gaps between, loosely coupling, or decoupling formal structures from actual work activities" (Orton & Weick 1990:207).

Yet, in looking for the causal mechanisms for both student achievement and, in the following analyses, principals' instructional management activity, the analyses have developed these analyses into those determining the type of relationship that exists between schools' organizational environments and principals' instructional management activity instead of that between principals' instructional management activity and individual student achievement. In particular, focussing on the loosely coupled structures and contexts between hierarchical levels, which leads to a discussion of the effects of the centralization of a nation's educational system and whether or not or how this centralization associates with principals' instructional management activity. However, central goals and objectives of educational systems are not unique to centralized systems. Neither are they synonymous with tightly coupled goals, processes, and outcomes. Thus, the hierarchical nature of the organizational environment's relationship to principals' instructional management activity is not necessarily a product of a nation's educational centralization, but rather the organizational and institutional structure through which school governance, whether tightly or loosely coupled with principals' instructional management activity is implemented by principals. These investigations and considerations lead to a second proposition.

Proposition 2: *The characteristics of national school systems limit or contextualize how principals respond at the school-level to complexity in the organizational environment.*

Therefore, further hypotheses combine institutional theory with loose coupling and agency ideas. This approach looks at management as providing direction and leadership versus looking at management as a reaction, response to, or mediating element between conflicting organizational and environmental demands. As a result, principals' instructional management activity buffers or absorbs the disconnect between national schooling structure and policy and local schooling implementation and outcomes without exerting influence one to the other. More importantly, however, the relationship between local school environment complexity and principals' instructional management activity should be a positive one meaning that as local school environments become more complex, principals spend more time managing their schools. And, vice versa, as school environments become more simple, principals need to spend less time engaged in managerial activity, so that it is the complexity of local school environments that influence principals' instructional management activity more than individual characteristics of the environment. In addition, the nested relationship of local school environments within national environments suggests that the national environment limits or bounds the effects of local school environmental complexity on principals' instructional management activity. This leads to further hypotheses.

Hypothesis 2a: *Variation in principals' instructional management activity is associated with variation in local school environmental complexity.*

Hypothesis 2b: *Indicators of the national level organizational environment weaken the effect of local school environmental complexity on principals' instructional management activity.*

In other words, the national level organizational environment has a limiting or bounding effect on the relationship between principals' instructional management activity and school level environmental complexity. Therefore, what principals do is a response to pressures from multiple levels and sources, and although I expect a positive association between local school environmental complexity and principals' instructional management activity, these associations are nested within national contexts that limit and shape this association in the first place.

THE TIMSS DATA

These analyses use data from the Third International Mathematics and Science Study (TIMSS) because of (1) the multilevel and cross-national breadth of its coverage, (2) the appropriate measures of principals' managerial activity and school environment contained in the background questionnaires, and (3) the measures of student achievement, which are obtained through standardized mathematics achievement testing (Beaton 1998). TIMSS was administered under the auspices of the International Association for the Evaluation of Educational Achievement (IEA) at the end of the school year (mid-1995) except for countries in the Southern Hemisphere, which have a different academic calendar. Their school year ended in late 1994 and, therefore, TIMSS was administered at

that time for those countries. TIMSS represents an international sample of students, teachers, and school principals from more than 40 different nations, which includes nations from most of the world's geographic regions as well as nations with both developing and developed economies (see IEA 1997 for a complete list of TIMSS countries).

Within the TIMSS countries, three sample populations comprising five grade levels were administered mathematics and science achievement tests and background questionnaires for individual students, classroom teachers, and school principals. The three sample populations contain data related to students (1) in the two adjacent grades containing the most 9-year-olds, (2) in the two adjacent grades containing the most 13-year-olds, and (3) in their final year of secondary schooling. These sample populations represent groups approximately equivalent to U.S. 4^{th}, 8^{th}, and 12^{th} graders, respectively. This analysis only uses data from the 8^{th} grade equivalent level due to the questions related to principals' managerial activity unique to principal questionnaires available at this level.

In each TIMSS nation, a multi-stage sampling design was used to select a nationally representative sample of math and science classrooms (see IEA 1997, Chapter 3 for details). The students and teachers of these classrooms and their school principals make up the sample. TIMSS administered math and science achievement tests to all students in the selected classrooms. Students also completed surveys that included questions about their families, teachers, schools, and after-school activities. School principals completed questionnaires about their work schedule, their involvement in

school and professional activities, and general school characteristics. Both achievement tests and questionnaires were designed to be comparable across classrooms, schools, and countries.

Using the TIMSS data, therefore, this study estimates the relationship of principals' managerial activity with local and national level organizational environments, estimates the complexity of these environments, and measures how complexity influences the relationship of principals' managerial activity within these environments.

MEASURES

The measures used in these analyses (and summarized in Table 1) all rely on one dependent variable, principals' instructional management activity. The independent predictor variables are measures of local and national stakeholders, school environmental complexity, and bureaucratic and administrative centralization. The independent control variables are indicators of percentage female students at each principal's school, whether and to what degree students at the school speak the language of the test at home, school mean of students' mother's education level, and a mean school measure of students' socioeconomic status.

Table 1 About Here

The primary dependent variable in this study is *principals' instructional management activity* (PIMA). This is a composite variable derived from several items on

the principal questionnaire; and it represents the total hours per month that principals spend on instructional management activities (international mean = 57.64, sd = 41.98). To create this variable I summed the hours per month principals reported spending (1) discussing educational objectives with teachers, (2) initiating curriculum revision or planning, (3) engaging in professional development activities, (4) training teachers, (5) giving demonstration lessons, and (6) teaching (including preparation). I excluded reports of time spent on non-instructional activities.[2] These "instructional management" measures comprise the best representation of principals' instructional management activity because they are primarily each indicators of either principal's direct or indirect management of instruction. In other words, although these activities may serve functions other than instruction, these "other" functions are secondary to the primary purpose of providing or managing instruction.

In John W. Meyer and his associates work on organizations there has been much speculation about a technical core of activities and processes within institutionalized organizations (e.g., Meyer & Scott 1983). There has often been, however, very little empirical measurement of this technical core because the institutional argument suggests that there is a dramatic cross-national regression towards the mean in institutional organizations regarding technical processes and activities. Principals' instructional management activity is unique as an empirical measure of this technical core because while it may be driven in large part due to nation level norms for institutional legitimacy surrounding student performance, it is also sensitive to schools' organizational environments. Therefore, this measure of principals' managerial activity measures the

technical core of activity, but is non-normative and retains nation level distinctiveness due to its dual purpose as a tool for institutional legitimacy of each principal's school as an organization.

The curriculum decision-making influence of local and national stakeholders constitutes most of the measures of schools' organizational environmental pressures. These indicators are dummy variables indicating whether principals reported that particular stakeholders have "a lot" of influence in determining the curriculum that is taught at their school (a lot = 1, other = 0) and indicate the percentage of principals reporting that each stakeholder has "a lot" of influence in determining the curriculum that is taught at their school. *Local stakeholders* are the local school board (international mean = 0.23, sd = 0.42), school principal (international mean = 0.39, sd = 0.49), teachers (international mean = 0.39, sd = 0.37), parents (international mean = 0.04, sd = 0.20), students (international mean = 0.09, sd = 0.28), religious groups (international mean = 0.04, sd = 0.19), and the business community (international mean = 3.65E-03, sd = 0.06). *National stakeholders* are the national curriculum association (international mean = 0.61, sd = 0.49), the national subject association (international mean = 0.15, sd = 0.35), regional school governing organization (international mean = 0.38, sd = 0.49), textbook publishers (international mean = 0.12, sd = 0.33), and teacher unions (international mean = 0.03, sd = 0.18).

I empirically measure the bureaucratic centralization of school management in two ways: (1) as a national expert reported measure and (2) as an operational measure of curricular centralization derived from principals' responses to items on the TIMSS

principal questionnaire. The *"official" reported measure of curricular centralization* (international mean = 4.25, sd = 1.10) was rated using the country reports on curriculum control in the *International Encyclopedia of Education* (Husén & Postlethwaite 1994). This measure of bureaucratic centralization ranges from 5, meaning predominantly national level curricular influence, to 1, meaning predominantly local level influence. I use these reported measures of curricular centralization for several reasons: first, because an acknowledged expert writes each national report on that nation's educational system, including curricular governance; secondly, because these national experts reporting on curricular governance use the most updated and accurate primary documents as their own data sources—primary documents that I would be using myself had I had the time and material resources to collect all of these nations' various curricular documents in the first place; and finally, I use the reports by national experts found in the *International Encyclopedia of Education* because these experts are often privy to non-documented curricular governance data that I could not collect even given the opportunity to try.

The *operational measure of curricular centralization* (international mean = 2.24, sd = 4.77) is the ratio between extensive national administrative responsibility for curricular policies and extensive local responsibility derived from responses by school principals in the TIMSS survey aggregated to the national level. Nations with ratios near zero are highly decentralized in practice, while those with larger ratios show components of both centralization and decentralization. As a ratio of national to local (i.e., school) level curricular influence, nations with ratios less than 0.5 are mostly decentralized in curricular governance. Nations with ratios between 0.5 and 1.5 are relatively evenly

mixed between decentralized and centralized curricular governance. And, nations with ratios greater than 1.5 have mostly centralized curricular governance systems.

These analyses also use two other measures of bureaucratic centralization of schools. *Center of decisions regarding textbooks* (international mean = 1.86, sd = 0.94) is a categorical measure indicating the centralization of decision-making regarding the selection of textbooks used in classrooms, where 3 is relatively centralized and 1 is relatively decentralized. *Curriculum-based external exit exams* (international mean = 0.73, sd = 0.41) is a dummy variable where 1 indicates the use of the exit exams and 0 does not.

To create the measure of *school environmental complexity* (international mean = 2.27, sd = 1.56), the same indicators from the TIMSS questionnaire that were used to create the stakeholder variables were each given a 1 if principals reported "extreme" (i.e., "a lot of") curricular influence from each of the 12 categories of environmental influence on school curriculum. The sum for each principal was then calculated. This new measure of complexity of schools' organizational environment, therefore, not only represents the intensity of stakeholder pressure, but the complexity of the organizational environment through the combination of stakeholder influences into this one measure. Therefore, the environmental entities that make up the organizational environment included in this measure of complexity are all of those that principals report have a lot of influence on the curriculum used in their schools from a set of twelve, which includes (1) the national curriculum association, (2) the national subject association, (3) regional school governing organization, (4) local school board, (5) school principals, (6) teachers, (7) parents, (8)

students, (9) religious groups, (10) the business community, (11) textbook publishers, and (12) teacher unions. This variable ranges from 0 to 12, with 0 being the least and 12 being the most complexity possible.

This school organizational environment complexity measure varies within rather than across national systems of education. This is important because it means that although there is variance in the complexity of environments due to real local needs and unique school situations, environmental penetration into schools' managerial processes and hierarchy is a standard element of schools as cross-nationally institutionalized local organizations.

Female (international mean = 0.49, sd = 0.20) is a whole number percentage representing the percent of female students in each school. It is derived from a student-level dummy variable with 1 indicating female students and 0 indicating male students. *Speaks language of test at home* (international mean = 2.83, sd = 0.33) is a student reported categorical indicator of how frequently the student speaks the language of the test at home (1=never, 2=sometimes, 3=always).

To measure *socioeconomic status* (international mean = 3.28, sd = 0.76) I use a student reported indicator of the number of books at home. This SES variable is a five-point categorical scale with responses ranging from "0-10 books" to "more than 200 books". This SES measure is included in these analyses as a school-level mean score of this categorical student variable. Incidentally, when replicating the analysis with a more complex, nine-item measure of socioeconomic status, I find nearly identical results. And finally, *mother's education level* (international mean = 3.22, sd = 1.15) is another

categorical variable ranging from "finished elementary school" to "completed college." Like SES, this measure is included in these analyses as a school-level mean score of this categorical student variable.

ANALYSES

The first analysis estimates the relationship between principals' instructional management activity and selected elements of the *local* school environment. The variables used in this analysis are the dependent variable, principals' instructional management activity (PIMA), the independent variables comprised of distinct indicators of local level stakeholder influence on curricular decision-making within schools as well as several measures included as controls to account for variance in the school environment other than that measured by stakeholder influence. The analysis is estimated by the following model at the school level both within nations and cross-nationally:

$$\text{PIMA} = \beta_0 + \beta_{1\text{-}7}\text{LocalStakeholders} + \beta_{8\text{-}11}\text{Controls} + e \qquad \text{(Eq. 1)}$$

The coefficient β_0 represents the mean number of hours per month that principals spend on instructional management activity. β_1, β_2, β_3, β_4, β_5, β_6, and β_7 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following local level stakeholder's influence on curricular decision-making: local school board, school principal, teachers, parents, students, religious groups, and business community. β_8, β_9, β_{10}, and β_{11} respectively represent the

number of hours per month that principals spend on instructional management activity for each of the following control variables in the model: female, language of test spoken at home, number of books in the home, and mother's education level. *e* represents residual variance not accounted for by the other independent variables.

The first proposition states that principals manage instruction according to organizational norms established by environmental pressures. By estimating the influence that stakeholder pressure in the local school environment has on principals' instructional management activity, this analysis helps answer the question of why do principals do what they do by addressing the first proposition for the local school level. In turn, the hypothesis is tested which states that variation in the number of hours per month that principals' spend on instructional management activity will associate with variation in local level stakeholders' curricular decision-making influence.

Given my proposition that principals manage instruction according to organizational norms established by environmental pressures, and the fact that stakeholder influence is an environmental pressure, I expect that variation in the number of hours per month that principals spend on instructional management activity will be positively associated with variation in each of the indicators of stakeholder influence. Consequently, the coefficient for each of the stakeholder variables represents the number of hours per month that each stakeholder's influence adds to the mean number of hours per month that principals spend on instructional management activity simply by having "a lot" of influence on curricular decision-making. If, however, any of the stakeholder coefficients is negative then my expectation that principals' instructional management

activity is positively associated with stakeholder influence at the local school level is not true for that stakeholder. However, any significant effect, whether positive or negative, confirms both my proposition that principals manage instruction according to organizational norms established by environmental pressures and my hypothesis that variation in principals' instructional management activities associates with variation in local stakeholder influence on curriculum.

The second analysis estimates the relationship between principals' instructional management activity and selected elements of the *national* school environment. The variables used in this analysis are the dependent variable, principals' instructional management activity (PIMA), the independent variables comprised of distinct indicators of national level stakeholder influence on curricular decision-making within schools, indicators of curricular and administrative centralization, and several measures included as controls to account for variance in the school environment other than that measured by stakeholder influence and centralization. The analysis is estimated by two models; first, the following model at both the within nation school level and the cross-national level:

$$\text{PIMA} = \beta_0 + \beta_{1\text{-}5}\text{NationalStakeholders} + \beta_{6\text{-}9}\text{Controls} + e \qquad \text{(Eq. 2a)}$$

The coefficient β_0 represents the mean number of hours per month that principals spend on instructional management activity. β_1, β_2, β_3, β_4, and β_5 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following national level stakeholder's influence on curricular decision-

making: the national curriculum association, the national subject association, regional school governing organization, textbook publishers, and teacher unions. β_6, β_7, β_8, and β_9 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following control variables in the model: female, language of test spoken at home, number of books in the home, and mother's education level. e represents the residual variance not accounted for by the other independent variables. The analysis is estimated with a second model at the national level only.

$$\text{PIMA} = \beta_0 + \beta_{1\text{-}5}\text{Centralization} + \beta_{6\text{-}9}\text{Controls} + e \qquad \text{(Eq. 2b)}$$

The coefficient β_0 represents the mean number of hours per month that principals spend on instructional management activity. β_1, β_2, β_3, β_4, and β_5 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following indicators of curricular and administrative centralization: extensive curricular consistency, "official" reported centralization of curriculum measure, operational centralization of curriculum measure, center of decisions regarding textbooks, and curriculum-based external exit exams. β_6, β_7, β_8, and β_9 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following control variables in the model: female, language of test spoken at home, number of books in the home, and mother's education level. e represents the residual variance not accounted for by the other independent variables.

The first proposition states that principals manage instruction according to organizational norms established by environmental pressures. By estimating the influence that stakeholder pressure in the national school environment has on principals' instructional management activity, this analysis helps answer the question of why do principals do what they do by furthering the first proposition for the national level. In turn the next hypothesis is tested which states that variation in the number of hours per month that principals' spend on instructional management activity will associate with variation in national level stakeholders' curricular decision-making influence and indicators of curricular and administrative centralization.

Given my proposition that principals manage instruction according to organizational norms established by environmental pressures, and the fact that stakeholder influence is a national environmental pressure, I expect that the number of hours per month that principals spend on instructional management activity will be positively associated with each of the indicators of stakeholder influence. I, however, expect that the indicators of curricular and administrative centralization will negatively associate with principals' instructional management activity because as centralization increases, the influence of individual stakeholders lessens. In other words, each of the stakeholder variables represents the number of hours per month that each stakeholder's influence adds to the mean number of hours per month that principals spend on instructional management activity simply by having "a lot" of influence on curricular decision-making. Conversely, the number of hours principals spend on instructional management activity per month will decrease with each additional unit of centralization.

The third analysis estimates the relationship between principals' instructional management activity and school environmental complexity. The variables used in this analysis are the dependent variable, principals' instructional management activity (PIMA), the independent variables comprised of a measure of organizational complexity as well as several measures included as controls to account for variance in the school environment other than that measured by stakeholder influence. The analysis is estimated by the following model at both the school level within nations and at the national level:

$$\text{PIMA} = \beta_0 + \beta_1\text{Complexity} + \beta_{2\text{-}5}\text{Controls} + e \qquad \text{(Eq. 3)}$$

The coefficient β_0 represents the mean number of hours per month that principals spend on instructional management activity. β_1 represents the number of hours per month that principals spend on instructional management activity for each unit of school environmental complexity. β_2, β_3, β_4, and β_5 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following control variables in the model: female, language of test spoken at home, number of books in the home, and mother's education level. e represents the residual variance not accounted for by the other independent variables.

The first proposition states that principals manage instruction according to organizational norms established by environmental pressures. By estimating the influence that school environmental complexity has on principals' instructional management activity, this analysis helps answer the question of why do principals do what they do by

testing the hypothesis that states that variation in the number of hours per month that principals' spend on instructional management activity will association with variation in school environmental complexity.

Given my proposition that principals manage instruction according to organizational norms established by environmental pressures, and the fact that environmental complexity is a measure of environmental pressure, I expect that the number of hours per month that principals spend on instructional management activity will be positively associated with school environmental complexity. In other words, each additional stakeholder's influence adds to environmental complexity, and each additional unit of complexity adds to the mean number of hours per month that principals spend on instructional management activity.

The fourth analysis estimates the interaction effect of centralization on the main effect between principals' instructional management activity and school environmental complexity. The variables used in this analysis are the dependent variable, principals' instructional management activity (PIMA), the independent variables comprised of a measure of organizational complexity, measures of curricular and administrative centralization, and several measures included as controls to account for variance in the school environment other than that measured by stakeholder influence and centralization. The analysis is estimated by the following models; the first at the school level and the second and third at the nation level.

$$PIMA_{ij} = \beta_{0j} + \beta_{1j}Complexity_{ij} + \beta_{2j\text{-}5j}Controls_{ij} + r_{ij} \quad \text{(Eq. 4.1)}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01\text{-}05}\text{Centralization}_j + \gamma_{06\text{-}09}\text{Controls} + u_{0j} \quad \text{(Eq. 4.2)}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11\text{-}15}\text{Centralization}_j + u_{1j} \quad \text{(Eq. 4.3)}$$

where β_{0j} is the mean hours per month principals spend on instructional management activity within every j^{th} nation, and r_{ij} is a school level residual assumed to be normally distributed and with a mean of zero and variance σ^2. It is again important to note that all of the regression coefficients (the βs) in the school level equation are indexed by j indicating that within the multilevel model a school level regression coefficient is estimated for every nation in the sample. β_1 represents the number of hours per month that principals spend on instructional management activity for each unit of school environmental complexity. β_2, β_3, β_4, and β_5 respectively represent the number of hours per month that principals spend on instructional management activity for each of the following control variables in the model: female, language of test spoken at home, number of books in the home, and mother's education level.

At the nation level, where γ_{00} is an estimate of the cross-national mean hours per month principals spend on instructional management activities, $\gamma_{01\text{-}05}$ estimate the effects of centralization predictors on the national mean of principals' instructional management activity, $\gamma_{06\text{-}09}$ represent the national level contextual effects of each of the control variables on the national mean, and both u_{0j} and u_{1j} are nation level residuals assumed to be normally distributed. In the second nation level model specifically, γ_{10} is an estimate

of the cross-national effect of school environmental complexity on principals' instructional management activity. γ_{11}, γ_{12}, γ_{13}, γ_{14}, and γ_{15} respectively represent the effects on the relationship between school environmental complexity and principals' instructional management activity for each of the following indicators of curricular and administrative centralization: extensive curricular consistency, "official" reported centralization of curriculum measure, operational centralization of curriculum measure, center of decisions regarding textbooks, and curriculum-based external exit exams.

Given my proposition that the characteristics of national school systems limit or contextualize how principals respond to school-level complexity in the organizational environment, I expect that the number of hours per month that principals spend on instructional management activity will be positively related to school environmental complexity, but that this relationship will decrease (i.e., be less positive) as centralization is stronger. By estimating the influence that centralization has on the relationship between school environmental complexity and principals' instructional management activity, this analysis helps answer the question of why principals do what they do by testing the hypothesis that states that the effect of school environmental complexity on principals' instructional management activity is decreased by centralization of the national school system.

Therefore, if the coefficient for each of the measures of centralization is significant and negative, then both my second proposition and the consequent hypothesis are true. If, however, the coefficients for each of the measures of centralization are either positive, non-significant, or both then both my second proposition and associated

hypothesis are either not true or inestimable using these models. If the centralization coefficients are positive, then centralization strengthens the association between school environmental complexity and principals' instructional management activity suggesting that curricular and administrative centralization enhance the additive influence of stakeholders' influence on curricular decision-making (i.e., complexity). If, however, the coefficients are not significant, then the centralization of national systems has no measurable effect on this relationship, at least using these models.

RESULTS

The first analysis estimated the relationship between principals' instructional management activity and indicators of the local school environment, namely local level stakeholder influence on curricular decision-making. I expected that variation in the number of hours per month that principals spend on instructional management activity would be positively associated with variation in each of the indicators of stakeholder influence.

The first column in Table 2 shows results from the cross-national OLS regression described in the first analysis. None of the predictor variables are significant, which indicates that local stakeholders do not significantly associate with principals' instructional management activity cross-nationally, and, in fact, none of the independent variables are significant predictors of principals' instructional management activity in cross-national analyses. This suggests that there is a contextualizing element at the nation

or other sub-national level, which is not consistent across nations. In other words, the school environments in these nations uniquely vary, making variation both within and between nations difficult to measure or estimate in cross-national analyses.

Table 2 About Here

Table 3, however, shows results for every nation from the OLS regression model for the first analysis. These results are largely significant for local stakeholder indicators, but the size and direction of the coefficients varies among nations and local stakeholder indicators within nations. For example, the local school board results show that in 52% of the nations reported the local school board's influence on curricular decision-making was insignificantly associated with principals' instructional management activity while 26% reported a significantly negative association and 22% reported a significantly positive association. For school principals, 26% of the nations posted insignificant results while 41% posted significantly positive and 33% posted significantly negative results. The results for the other local stakeholder variables are similarly mixed between nations. While this is certainly not the positive association that I expected, it is largely a significant association whether positive or negative.

Table 3 About Here

The preponderance of a significant association of either direction suggests that principals manage instruction according to organizational norms established by environmental pressures and that variation in principals' instructional management activity associates with variation in local stakeholder influence on curriculum. While the empirical hypothesis is supported by the significant results, the theoretical proposition is confirmed because if principals did not manage instruction according to organizational norms, then all or at least most of the coefficients for local stakeholders would be insignificant. That there is within nation consistency enough to produce significant association results suggests that there are organizational norms resulting from those stakeholders' influences that influence principals' instructional management activity. There are, however, few discernable associations between which countries post positive, negative, or insignificant results for each local stakeholder variable and the characteristics of like nations. The exception is that national curriculum association influence has a positive rather than negative relationship with principals' instructional management activity in predominantly former Soviet and socialist republics such as the Czech Republic (3.65), Slovak Republic (9.16), Lithuania (24.61), Romania (4.40), Russian Federation (7.21), and Slovenia (16.19). The exceptions to this rule are Iran (6.08) and Ireland (6.08). This is unusual because the centralization argument presented in the last chapter suggests that as educational systems become more centralized, the roles and activities of principals become more prescribed thereby lessening principals' responsibility for instruction and reducing the hours per month they spend on instructional management activities.

The second analysis estimated the relationship between principals' instructional management activity and selection elements of the national school environment. Analysis 2a and 2b used the independent predictor variables for national stakeholders and centralization, respectively. I expected that the number of hours per month that principals spend on instructional management activity would be positively associated with each of the indicators of national stakeholder influence on curricular decision-making, but negatively associated with measures of centralization.

In the second column of Table 2, the results show no significant association between national stakeholders influence on curricular decision-making and principals' instructional management activity at the cross-national level. Again, this suggests that there is a contextualizing element at the nation or other sub-national level, which is not consistent across nations. Table 4, however, shows results for every nation from the OLS regression model for the second analysis. These results are largely significant for national stakeholder indicators, but the size and direction of the coefficients varies between both nations and local stakeholder indicators within nations as it did for indicators of local stakeholder influence. And, again while my expectation that the results would show positive association between principals' instructional management activity and national stakeholder influence is not entirely true, my proposition that principals manage instruction according to organizational norms established by environmental pressures is again confirmed. There are, however, few discernable associations between which countries post positive, negative, or insignificant results for each local stakeholder variable and the characteristics of like nations except for the positive association between

national curriculum associations and principals' instructional management activity in former Soviet and socialist republics as mentioned above for the first analysis.

Table 4 About Here

Results for the second half of the second analysis, shown in the third column of Table 2 again show largely insignificant results for any of the independent variables except for curriculum-based external exit exams (25.48, $p<0.05$). I expected negative associations between these national level centralization variables and principals' instructional management activity, but the results do not show significant negative results. Instead, the results show two insignificant negative results, one insignificant positive result, and one significant positive result already mentioned above. This suggests that at the cross-national level and for national means of principals' instructional management activity, centralization does not decrease the time principals spend on instructional management activity unless it is tied to achievement exams. Since curriculum-based external exit exams is such a high stakes academic priority it is not surprising that it encourages rather than limits how much time principals spend on instructional management. In nations where curriculum based external exit exams exist, principals' and schools' legitimacy may be tied to average student scores on these tests. It is also possible that the external pressure from parents and other stakeholders in these nations for students to do well on these tests is enormous and drives the activity of principals.

The third analysis estimated the relationship between principals' instructional management activity and school environmental complexity. I expected that the number of hours per month that principals spend on instructional management activity would be positively associated with school environmental complexity. In other words, I expected that as school environments became more complex, principals would have to become more involved in instructional management at their schools.

In the fourth column of Table 2, the results show that again there are no significant independent predictors of principals' instructional management activity at the cross-national level, which again suggests that there is a contextualizing element at the nation or other sub-national level, which is not consistent across nations. Table 5 shows the results of the third analysis by nation, however. As with the previous two analyses by nation, there is much variation in significance and direction of predictor coefficients. School environmental complexity is a significantly positive predictor of principals' instructional management activity in 45% of the nations, significantly negative in 33%, and insignificant in 21%. The significantly positive nations are (in ascending strength of association) Iran, Spain, Greece, the Czech Republic, Ireland, Portugal, the United States, the Russian Federation, Denmark, Thailand, Slovenia, Israel, Hong Kong, the Slovak Republic, and Singapore. The significantly negative nations are (in ascending strength of association) Sweden, Colombia, Germany, Flemish Belgium, Korea, Romania, Canada, Latvia, Lithuania, New Zealand, and Switzerland. The insignificant nations are (in alphabetical order) Australia, Austria, Cyprus, France, Hungary, Iceland, and the Netherlands. Therefore, in, for example, Singapore every additional stakeholder adds

9.96 hours of principal instructional management activity per month, in Switzerland every additional stakeholder decreases the hours of principal instructional management activity per month by 5.76 hours.

Table 5 About Here

My expectation that principals' instructional management activity would be positively associated with school environmental complexity is not confirmed in every nation, but again my proposition that principals manage instruction according to organizational norms established by environmental norms is again confirmed by the variation in significance and direction between nations. In addition, my hypothesis that variation in principals' instructional management activities is associated with variation in school environmental complexity is also supported in 78% of the nations for which this model was estimated.

The fourth analysis estimated the interaction effect of centralization on the main effect between principals' instructional management activity and school environmental complexity. I expected that the association between what principals do and complexity in the school environment would be weakened as nations become more centralized.

Similar to the results in the fourth column of Table 2, the results shown in Table 6 suggest that centralization does not decrease the association between time principals spend on instructional management activity and school environmental complexity unless it is tied to achievement exams. Although the coefficients were largely insignificant, the

direction of the coefficients is in the predicted (negative) direction for all measures of centralization except for curriculum-based external exit exams, and the reasons for this exception have already been suggested above in the description of the results of the third analysis.

Table 6 About Here

Perhaps the most surprising result in each of these analyses is the non-effect of bureaucratic centralization on these school-level relationships. There are several explanations possible for why this non-effect occurs. First, is that there is no relationship between bureaucratic centralization of schooling, and curriculum in particular, and what goes on at the school level. This is highly unlikely since the locus of decision-making is frequently estimated as a highly influential, and frequently limiting, factor on school governance. A second explanation is that the measures of bureaucratic centralization used in this analysis are inaccurate. This is possible, but improbable given that four unrelated measures of bureaucratic centralization were each used in independently estimated models. Even if there had been some sort of problem with one or more of the measures, one of the four measures should have shown some significant relationship if one existed. A third possibility is that multicollinearity exists between one or more of the independent variables. This, however, has already been considered and avoided through the estimation and examination of bivariate correlations between all of the independent variables before inclusion in the models presented here.

A more likely explanation for why the measures of bureaucratic centralization do not have a bounding effect on the relationship between schools' environmental complexity and principals' managerial activity is that bureaucratic centralization is itself a complex organizational concept with differing directions of influence at different organizational levels. As Astiz, Wiseman, and Baker (forthcoming) argue, there is evidence that curricular governance and implementation are indicators of a "mixing" of centralized and decentralized models of curricular administration in national educational systems and that these models are indeed mixing as a result of economic and institutional globalization processes. Since the models presented here are estimating effects of the interaction between organizational levels, which can each be characterized by contradictory models of bureaucratic centralization, the influence of these national level organizational environment indicators of centralization is in effect cancelled out.

Therefore, the mixing centralization of curricular goals and standards-setting authority with the decentralization of curricular implementation and evaluation responsibility creates an interaction effect when measures of bureaucratic centralization are included in the models, which suggests that neither effect is dominant nor do the measures at the local and national level associate with each other. There is, therefore, the distinct possibility that principals' managerial activity does not mediate or dually respond to environmental indicators of bureaucratic centralization and may be completely decoupled from these elements.

So, with a preponderance of insignificant coefficients for national contextual predictors of centralization, but a largely positive and significant association in the

multilevel models between school environmental complexity and principals' instructional management activity, it becomes necessary to consider that the effect of national context on the school level relationship is either not being measured or estimated appropriately. To investigate this dilemma further, I looked more descriptively at the relationship between the largely significant relationships between principals' instructional management activity and school environmental complexity (i.e., the main effect) and each measure of centralization. I first correlated the main effect and the measures of centralization. Table 7 shows the results of these correlations. While curriculum-based external exit exams are still positively related to the main effect, they are insignificantly correlated with it. Likewise,textbook centralization is positive, but insignificantly related to the main effect. The "official" reported curricular centralization is also insignificant, and positively related. And, unlike the direction of the other measures of centralization, the operational measure of curricular centralization is both negative and insignificant. The results shown in Table 7, therefore, suggest that centralization does not significantly correlate with the main effect.

Table 7 About Here

One reason why the regression analyses did not find significant relationships between the main effect and the operational measure of curricular centralization may be that the relationship between the main effect and centralization is curvilinear. This would mean that when centralization is very low and very high then the main effect is low, but

in the middle range of centralization the main effect is higher. In other words, in decentralized nations the time principals spend on instructional management activity decreases as school environmental complexity increases. As centralization increases, so does the relationship between principals' instructional management activity and school environmental complexity. But after centralization reaches a certain level, principals again decrease the amount of time they spend on instructional management activity as school environmental complexity increases. In spite of these suppositions, analyses not reported here (including several scatterplots of the main effect coefficients and measures of centralization) suggest that no curvilinear relationship exists.

INTERPRETATION OF RESULTS

A neo-institutional perspective suggests that because national environments are more institutionally dominant they bound or limit the effects of school level organizational environment complexity on what principals do as managers. The problem has, heretofore, been how to measure this interaction effect between multiple environmental influences at multiple levels. However, a first clue suggesting how to estimate this coupling of principals' managerial activity to local conditions and larger organizational environment pressures lies in the descriptive statistics of principals' managerial activity by nation along with information on the national rankings of bureaucratic centralization and complexity. This evidence suggests that countries with highly centralized bureaucratic systems of school management, such as France, spend more time responding to requests from education officials than other nations; and, that

nations with highly decentralized bureaucratic systems of school management, such as the USA, spend more time talking with parents and counseling and disciplining students. Clearly, there are significant qualitative differences in these types of general managerial activities most frequently engaged in by principals in these different national education systems when divided by their bureaucratic management characteristics.

But there is no clear rule for how principals will act given their bureaucratic centralization ranking because there are also many organizational environment influences unique to each school within each nation. This fact is confirmed by the absence of significant correlations between principals' instructional management activity and measures of bureaucratic centralization at the cross-national level. Yet, bureaucratic centralization of school management is often a theoretically significant variable in analyses of educational organization and achievement and should be included in analyses of organizational environment coupling and complexity because of its potential impact on the activity of schooling managers such as principals and their response to both local and national level environmental influences. Nonetheless, there are still other factors that can be measured which influence the instructional management activity of school principals within each nation.

In nations where national environment penetration into schools, measured as stakeholder influence on school curriculum, is higher than other nations, the effect of school environmental complexity on principals' instructional management activity will be bounded by the national environment resulting in a negative influence of national organizational environment on this effect. In other words, the indicators of national

organizational environment should theoretically influence or constrain the effect of school organizational environmental complexity on principals' managerial activity. The various directions and significance of associations between principals' instructional management activity and school environmental complexity by nation suggests that in nations where local environmental complexity is higher than in other nations, principals will spend more time on internal school activities resulting in a positive effect of school organizational environment complexity on principals' managerial activity. And in nations where both local and national environments are strong or influential, they will not necessarily spend more time on principals' managerial activity.

CONCLUSION

This study asked why school principals do what they do given the variation in school environments both within and between organizational levels of schooling and is the first to estimate principals' instructional management activities based on the complexity of differently defined school contexts at the national and cross-national levels. The results of the study show that in nation-specific analyses (1) variation in principals' instructional management activity associates with variation in local and national stakeholder influence on curriculum, variation in curricular and administrative centralization, and variation in school environmental complexity, and that (2) centralization contextualizes the effect of local school environmental complexity on principals' instructional management activity. In cross-national analyses, however, there are few clear associations between principals' instructional management activity and stakeholder influence, centralization, or

environmental complexity. Within nations, therefore, principals' actions are determined according to organizational norms and in response to environmental pressures, and principals' instructional management activity associates with environmental complexity both within and between organizational environments. Although individual principals may adjust their behavior to fit the needs and concerns of local school communities, there are institutionalized characteristics of schooling systems that set the legitimate model for principals' managerial activity within each nation. And, principals' opportunities to contextualize their specific activity at the local school level is nested within and, therefore, associated with these nationally legitimate models. However, these analyses have shown no discernable patterns of principals' instructional management activity across nations, which further suggests that organizational norms for principals' instructional management activities are nationally-contextualized.

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Table 1. International descriptive statistics for all school-level variables

	N	Minimum	Maximum	Mean	SD
Dependent Variable					
PIMA principals' instructional management activity	164423	0	485	57.64	41.98
Independent Predictive Variables					
School Environmental Complexity	164037	0	12	2.27	1.56
Local Stakeholders					
Local School Board	142136	0	1	0.23	0.42
School Principals	161031	0	1	0.39	0.49
Teachers	163218	0	1	0.39	0.37
Parents	162071	0	1	0.04	0.20
Students	161340	0	1	0.09	0.28
Religious Groups	161613	0	1	0.04	0.19
Business Community	161799	0	1	3.65E-03	0.06
National Stakeholders					
National Curriculum Association	128204	0	1	0.61	0.49
National Subject Association	156426	0	1	0.15	0.35
Regional School Governing Organization	156773	0	1	0.38	0.49
Textbook Publishers	161823	0	1	0.12	0.33
Teacher Unions	161102	0	1	0.03	0.18
Independent Control Variables					
Female	194894	0	1	0.49	0.20
Language	183923	1	3	2.83	0.33
Mother's Education	179572	1	6	3.22	1.15
SES (Books)	183974	1	5	3.28	0.76
Valid N (listwise)	89035				

Table 2. Cross-national linear regression estimates for principals' instructional management activity.

DV=Principals' Instructional Management Activity	Analysis 1	Analysis 2a	Analysis 2b	Analysis #3
Independent Predictive Variables				
School Environmental Complexity	--	--	--	-2.43 (7.04)
Local Stakeholders				
Local School Board	-77.66 (45.40)[a]	--	--	--
Principal	-39.88 (44.59)	--	--	--
Teachers	-10.76 (50.47)	--	--	--
Parents	530.48 (401.42)	--	--	--
Students	98.90 (168.64)	--	--	--
Religious Groups	-473.42 (296.99)	--	--	--
Business Community	39.10 (866.15)	--	--	--
National Stakeholders				
National Curriculum Association	--	-21.57 (25.66)	--	--
National Subject Association	--	-21.91 (34.75)	--	--
Regional School Governing Organization	--	2.85 (35.96)	--	--
Textbook Publishers	--	50.61 (61.31)	--	--

Table 2 (continued).

DV=Principals' Instructional Management Activity	Analysis 1	Analysis 2a	Analysis 2b	Analysis #3
Teacher Unions	--	-17.74 (54.94)	--	--
Centralization				
"Official" Reported Measure of Curricular Centralization	--	--	-2.34 (3.44)	--
Operational Measure of Curricular Centralization	--	--	0.31 (0.90)	--
Center of Decisions Regarding Textbooks	--	--	-0.16 (5.67)	--
Curriculum-based External Exit Exams	--	--	25.48 * (9.74)	--
Independent Control Variables	n.s.	n.s.	n.s.	n.s.
N	32	32	32	32
R^2	0.46	0.34	0.33	0.13

* $p<0.05$
[a] Standard errors are in parentheses.

Table 3. Linear regression estimates for principals' instructional management activity regressed on local stakeholder influence on school curriculum by nation.

				Local Stakeholders						
Country ID	Country Name	Weighted N	R^2	Local School Board	School Principal	Teachers	Parents	Students	Religious Groups	Business Community
36	Australia	1391	0.10	5.78	-18.37 ***	11.13 ***	23.71 ***	-6.59	-22.46 **	-12.30
40	Austria	1173	0.08	-15.17 ***	-5.73 ***	7.49 ***				
56	Belgium (Fl)	964	0.17	2.73	-10.46 ***	-3.18		45.60 ***	-16.68 **	
124	Canada	5153	0.05	-3.65 ***	-7.51 ***	0.84	-17.35 ***	19.98 ***	8.73 **	16.37
170	Colombia	6040	0.47			23.81 ***	-3.40 +	-2.18	-26.50 ***	-34.13 ***
200	Czech Republic	2567	0.11	13.27 ***	9.94 ***	-3.53 *		-3.14		
201	Slovak Republic	1346	0.06		7.91	3.61			-16.23	-9.80
208	Denmark	1027	0.10	-4.36	6.65 ***	9.55 ***	-41.94 ***	10.23		
250	France	8136	0.12	-0.90 *	1.88	13.33 ***				
280	Germany	5306	0.18			10.39 ***	3.34	23.05 ***	-14.97 ***	8.80 ***
300	Greece	1747	0.52			-17.58 ***		24.64 ***		
344	Hong Kong	336	0.15	-10.49	13.74 ***	-0.48		20.93 *	63.71 ***	
348	Hungary	2436	0.13	-0.38	-4.66 *	0.06	23.72 ***	-26.21 ***	-57.38 ***	
352	Iceland	127	0.23	-3.32	-0.09	22.38 *				
364	Iran, Islamic Rep.	13700	0.16	29.41 ***	1.70 *	2.06 *	-5.16 ***	-20.85 ***	2.24 *	17.04 ***
372	Ireland	666	0.37			-3.06	20.97 **	-19.82 *	-1.55	42.38 ***
376	Israel	374	0.54		39.07 ***	-16.90 *		-31.03 *		
410	Korea	2358	0.02	4.81	6.45 **	-14.70 ***	17.11	-4.80	-18.26	
428	Latvia	520	0.11	9.15	-10.72 **	-2.15	-53.05 *	20.72 ***		
440	Lithuania	943	0.24	-9.79 *	2.21	-11.35 ***	-11.39	10.73 **	-81.11 ***	
528	Netherlands	859	0.08	-16.29 **	-0.73	-2.47		-28.51 **	31.12	
554	New Zealand	1234	0.19	-24.62 ***	-13.89 ***	8.03 *	-27.20 **	29.26 ***	19.98	-8.61
620	Portugal	954	0.26			6.43 *	0.73	4.15		3.24
642	Romania	6540	0.11	28.29 ***	-17.84 **	-32.40 ***		9.70		
643	Russian Federation	30998	0.11	3.62 ***	1.54 **	13.46 ***	7.36 ***	-9.19 ***		
702	Singapore	133	0.42	-27.54	7.36	-9.14		300.05		
724	Spain	11360	0.10	7.91 ***	-5.60 ***	7.60 ***	7.55	-33.30 ***	7.98 ***	7.62 **
752	Sweden	3537	0.11	2.55 *	-6.16 ***	11.43 ***	-31.71 ***	32.55 ***		-24.37 ***
756	Switzerland	2645	0.12	5.07	-17.48 **	18.53 ***		85.52 ***	-108.37 ***	
764	Thailand	2341	0.16	0.32	12.49 ***	12.01 ***	69.83 ***	-2.44	-20.91 *	
840	United States	24684	0.23	-13.49 ***	0.96 **	-0.28	65.67 ***	-64.71 ***	15.57 ***	50.90 ***
890	Slovenia	338	0.04	17.79	2.20	3.86				

* p<0.05, ** p<0.01, *** p<0.001

Table 4. Linear regression estimates of principals' instructional management activity regressed on national stakeholder influence on curriculum by nation.

Country ID	Country Name	Weighted N	R^2	National Stakeholders				
				National Curriculum	National Subject	Regional School	Textbook Publishers	Teacher Unions
36	Australia	1445	0.05	-13.36 ***	-9.54 *	-1.42	-31.88 ***	
40	Austria	1215	0.20	-3.44	11.26 ***	-16.36 ***	1.81	-27.74 ***
56	Belgium (Fl)	960	0.35	-2.19 *			-10.27	
124	Canada	4936	0.20		6.66 ***	4.44 ***	2.60	
170	Colombia	5784	0.21	-17.38 ***	10.02 ***	2.56 *	-11.53 ***	8.35 ***
200	Czech Republic	2556	0.07	3.65 **	-18.84 ***	0.30	-3.90	
201	Slovak Republic	1251	0.12	9.16 ***	11.70 *	9.49 *	-12.56 **	
208	Denmark	1035	0.21				8.52 ***	
250	France	7346	0.08	-16.28 ***	-1.23 *	-0.18	-1.52	
280	Germany	5237	0.03	-4.27 ***		-1.00	-14.01 ***	
300	Greece	1694	0.24	-4.96 ***	3.87 ***	2.39	-12.25 *	1.33
344	Hong Kong	325	0.19	6.41 +	-24.35		-7.66	
348	Hungary	2370	0.08	1.02	2.05	1.68	1.52	-8.65
352	Iceland	124	0.24	-5.72	-17.09	-12.99	-2.71	
364	Iran, Islamic Rep.	14025	0.04	6.22 ***	-6.47 ***	7.63 ***	-7.69 ***	3.40 **
372	Ireland	639	0.40	6.08 **	23.20 ***		-15.57	1.57
376	Israel	25	1.00		17.59			
410	Korea	2372	0.03	-13.69 ***	0.87	-11.37 ***	4.45	29.64
428	Latvia	467	0.13	-0.52	1.56	-18.10 ***	-14.53 ***	
440	Lithuania	921	0.26	24.61 ***		-34.08 ***	-5.50	
528	Netherlands	836	0.50		90.60 ***		-3.46	
554	New Zealand	1183	0.10	0.96	-31.24 ***	65.60 **		3.05
620	Portugal	924	0.26			4.79 **		
642	Romania	6079	0.11	4.40 ***	6.81 ***	-6.21 ***	-15.80 ***	13.47 ***
643	Russian Federation	32643	0.11	7.21 ***	22.62 ***	-4.68 ***	2.32 ***	28.94 ***
702	Singapore	132	0.11	0.16				
724	Spain	11002	0.08	-2.68 ***		3.58 ***	-9.92 ***	
752	Sweden	3590	0.07	-5.33 ***	-5.50	6.82 *	-2.36	12.28 ***
756	Switzerland	2674	0.13	-9.02 *	-39.08 ***	0.60	-10.14 *	50.11 ***
764	Thailand	2305	0.04	1.71	0.44	-2.76	-3.84	-14.01 ***
840	United States	24677	0.39		15.99 ***	-0.37	-6.80 ***	-26.02 ***
890	Slovenia	332	0.15	16.19 ***	1.16	4.32	-19.09 **	

* p<0.05, ** p<0.01, *** p<0.001

Table 4.1. International descriptive statistics for all school-level variables

	N	Minimum	Maximum	Mean	SD
Dependent Variable					
PIMA principals' instructional management activity	164423	0	485	57.64	41.98
Independent Predictive Variables					
School Environmental Complexity	164037	0	12	2.27	1.56
Local Stakeholders					
Local School Board	142136	0	1	0.23	0.42
School Principals	161031	0	1	0.39	0.49
Teachers	163218	0	1	0.39	0.37
Parents	162071	0	1	0.04	0.20
Students	161340	0	1	0.09	0.28
Religious Groups	161613	0	1	0.04	0.19
Business Community	161799	0	1	3.65E-03	0.06
National Stakeholders					
National Curriculum Association	128204	0	1	0.61	0.49
National Subject Association	156426	0	1	0.15	0.35
Regional School Governing Organization	156773	0	1	0.38	0.49
Textbook Publishers	161823	0	1	0.12	0.33
Teacher Unions	161102	0	1	0.03	0.18
Independent Control Variables					
Female	194894	0	1	0.49	0.20
Language	183923	1	3	2.83	0.33
Mother's Education	179572	1	6	3.22	1.15
SES (Books)	183974	1	5	3.28	0.76
Valid N (listwise)	89035				

Table 5. Linear regression estimates of principals' instructional management activity regressed on school environmental complexity by nation.

Country ID	Country Name	Weighted N	R^2	School Environmental Complexity
36	Australia	1509	0.02	-1.34
40	Austria	1253	0.04	-0.65
56	Belgium (Fl)	978	0.13	-2.60 ***
124	Canada	5648	0.04	-3.61 ***
170	Colombia	6255	0.14	-0.63 *
196	Cyprus	38	0.12	-24.73
200	Czech Republic	2592	0.07	2.62 ***
201	Slovak Republic	1389	0.10	7.37 ***
208	Denmark	1035	0.05	4.51 ***
250	France	8539	0.08	-0.25
280	Germany	5479	0.01	-1.27 *
300	Greece	1783	0.22	2.49 ***
344	Hong Kong	336	0.04	6.53 **
348	Hungary	2469	0.07	-0.60
352	Iceland	131	0.20	0.94
364	Iran, Islamic Rep.	15368	0.02	0.49 ***
372	Ireland	681.00	0.11	2.73 **
376	Israel	393	0.43	5.91 *
410	Korea	2464	0.01	-2.62 ***
428	Latvia	537	0.08	-4.36 ***
440	Lithuania	981	0.20	-5.08 ***
528	Netherlands	859	0.06	-1.66
554	New Zealand	1272	0.11	-5.27 ***
620	Portugal	1004	0.07	2.77 ***
642	Romania	6864	0.10	-2.87 ***
643	Russian Federation	33564	0.11	3.87 ***
702	Singapore	134	0.04	9.96 *
724	Spain	12060	0.06	0.93 ***
752	Sweden	3811	0.04	-0.55 *
756	Switzerland	2842	0.10	-5.76 ***
764	Thailand	2341	0.07	4.75 ***
840	United States	24761	0.12	3.11 ***
890	Slovenia	345	0.07	5.61 ***

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 6. HLM regression models estimating the influence of local and national level contextual effects on principals' instructional management activity [a]

Fixed Effects	Model 3	Model 4	Model 5	Modle 6	Model 7	Model 8
Main Effect						
School Environmental Complexity	1.04 *	1.76	1.16 *	1.73 *	0.97	1.78
	(0.49)[b]	(1.17)	(0.52)	(0.83)	(0.69)	(1.43)
Interaction Effects						
"Official" Reported Measure of Curricular Centralization on Complexity Slope		-0.18				-0.08
		(0.32)				(0.26)
Operational Measure of Curricular Centralization on Complexity Slope			-0.09			-0.05
			(0.09)			(0.12)
Center of Decisions Regarding Textbooks on Complexity Slope				-0.35		-0.30
				(0.53)		(0.54)
Curriculum-based External Exit Exams on Complexity Slope					0.06	0.33
					(1.03)	(0.90)
Centralization						
"Official" Reported Measure of Curricular Centralization		-2.13				-2.49
		(3.08)				(2.73)
Operational Measure of Curricular Centralization			-0.12			0.34
			(0.37)			(0.49)
Center of Decisions Regarding Textbooks				-0.05		1.06
				(4.03)		(5.02)
Curriculum-based External Exit Exams					21.25 ***	21.68 **
					(5.77)	(6.13)
Random Effects						
Level 2	434.51	441.44	450.09	451.65	368.80	404.22
Level 1	1211.03	1211.25	1211.26	1211.16	1211.31	1211.98

* p<0.05, ** p<0.01, *** p<0.001

[a] School N=4383, Country N=31

[b] Standard errors are in parentheses.

Table 7. Cross-national correlation between the main effect (principals' instructional management activity on schools' environmental complexity) and measures of centralization.

		Main Effect[1]
"Official" Reported Measure of Curricular Centralization	Pearson Correlation	0.171
	Sig. (2-tailed)	0.341
	N	33
Operational Measure of Curricular Centralization	Pearson Correlation	-0.114
	Sig. (2-tailed)	0.543
	N	31
Center of Decisions Regarding Textbooks	Pearson Correlation	0.166
	Sig. (2-tailed)	0.357
	N	33
Curriculum-based External Exit Exams	Pearson Correlation	0.240
	Sig. (2-tailed)	0.179
	N	33

[1] The correlations were done using the absolute values of only the significant coefficients. Insignificant coefficients were included as zeroes.

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